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been confined to that part of Patagonia north of the Rio Santa Cruz, for this river forms the natural southern boundary line for lizards as well as of armadillos though a few have been scattered south of it by man. In describing the Guanaco on page 271, he says: "Their presence in Fuego, to which island the rhea, puma and deer have not gained access, is but an illustration of their superior powers of self distribution." The distribution of guanaco on Tierra del Fuego is far more probably attributable to the agency of man, for since time immemorial the channel Indians have plied between Patagonia and Fuego in their canoes and might easily have introduced these animals.

BARNUM BROWN.

ZOÖLOGY.

A Summary of the Coccidæ.[1] — The new "*Catalogue of the Coccidæ of the World*" by Mrs. M. E. Fernald, just published by the Massachusetts Agricultural Experiment Station, will be of immense value to students of these insects. For the first time since Signoret's "Essai" appeared, nearly thirty years ago, the species are catalogued with full bibliographical references. The preparation of the work has been a tremendous task, involving a search through the scattered literature published in every part of the world, and in all sorts of languages. There are few places where it could have been attempted, and few people who would have had the courage and perseverance to carry it out.

In the catalogue, 1449 species of Coccidæ are recognized as valid. The time since 1758, when the tenth edition of the "Systema Naturæ" appeared, may, so far as the Coccidæ are concerned, be divided into four periods. The first is from 1758 to 1799, during which 38 species were described. The second, from 1800 to 1850, saw the description of 57 valid species. The third, in which scientific coccidology really began, culminated in Signoret's famous work which covered the whole subject as then understood. In this period, from 1850 to 1875, 145 species now held valid were published. At the end of the period, only 240 species were known, as against 1449 in 1903. The last period, from 1876 to 1903, saw the publication of no less than 1209 species, and no doubt the next will make known a far larger number. The beginning of the fourth period was coincident with the first labors of Maskell of New Zealand, whose writings extended over many years, and made known the rich coccid-faunæ of New Zealand and Australia, treating also of a good many species from other regions. To-day, the workers are more numerous than ever before, but still not sufficiently so to deal with the material which might readily be obtained. The coccid-faunæ of Cuba and the Philippines, for example, are practically unknown, though there is no doubt that they are rich and interesting.

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[1] Fernald, Maria E. A Catalogue of the Coccidæ of the World. Special *Bulletin Mass. Agr. Exp. Sta.* No. 88, pp. 360.

The genera recognized in the list number 168, distributed in subfamilies as follows: — Diaspinæ, 34; Coccinæ, 57; Tachardiinæ, 2; Dactylopiinæ, 54; Conchaspinæ, 1; Phenacoleachiinæ, 1; Orthezinæ, 3; Margarodinæ, 5; Monophlebinæ, 11. I have thought it worth while to prepare the following summary, in which the genera are all listed according to their distribution, the number of species being given after each generic name. In doing this, I have made use of my own knowledge of the introduction of species into localities by human means, and of the fact of certain localities being erroneously cited. The purpose has been to throw light on the natural distribution of the genera.

(1.) Genera which are cosmopolitan or nearly so.

Palæococcus, 11.
Icerya, 16.
Coccus, 29.
Chionaspis, 59.
Asterolecanium, 27.
Lecaniodiaspis, 17.
Pulvinaria, 60.
Aspidiotus, 77.
Eriococcus, 60.
Phenacoccus, 36.
Pseudococcus, 100.
Lepidosaphes, 62.

Some of these, such as Aspidiotus, Coccus and Chionaspis, are assemblages of more or less discordant elements, and will no doubt eventually be subdivided. On the other hand, the species of Lecaniodiaspis, Asterolecanium and Eriococcus are certainly closely allied; and in Lecaniodiaspis there are undoubtedly native species in South Africa, Arizona and Japan, which are as nearly alike as they could very well be without being the same. When we consider the limited means of travel possessed by the Coccidæ, and the long period which must have elapsed during this wide migration, the persistence of type is something remarkable. The monophlebid genera Icerya and Palæococcus show the same sort of thing; and it is noteworthy that

Palæococcus is one of the few genera found fossil. Icerya is wanting in the colder parts of the Palæarctic and nearctic regions, being essentially a tropical and subtropical type.

(2.) Genera which are very widely distributed, but not cosmopolitan.

Margarodes, 10. Europe, Africa, America.

Orthezia, 19. Palæarctic, Nearctic, Neotropical.

Rhizococcus, 14. Europe, New Zealand, Australia, Texas; but the species may not be strictly congeneric.

Sphærococcus, 19. Australia, Japan, North America. The species may not be truly congeneric.

Ceroputo, 7. Europe; North America, extending into the Neotropical region.

Ripersia, 37. Holarctic, New Zealand, Australia, and doubtfully congeneric species in India and Trinidad.

Tachardia, 24. Cosmotropical.

Lichtensia, 12. Holarctic and Neotropical, but mainly the latter, if the species are really congeneric.

Ceroplastes, 62. Very abundant in the Neotropical region, extending into the warmer parts of the United States; Mediterranean region to South Africa; a few species in Asia and Australia, those in the latter country probably introduced.

Saissetia, 20. Cosmotropical.

Phenacaspis, 15. North America, Asia, S. Africa, Australia.

Chrysomphalus, 31. America, Australia, Asia. Numerous in Mexico.

Targionia, 18. Holarctic, Australia, India.

The doubt expressed as to the species of certain genera properly belonging together rests on the fact that the generic characters seem more or less artificial or arbitrary, and may include species which have independently come to have certain peculiarities. Thus, Rhizococcus is essentially an Eriococcus without a sac; but we do not know that the sac might not be independently lost in different parts of the world. The only way to settle these matters is by the study of all stages and both sexes of numerous species.

(3.) Genera having few species very widely separated.

Tessarobelus, 2. One in New Caledonia, one Panama. Probably they are not strictly congeneric.

Llaveia, 7. Neotropical except one from the East Indies, which may not be properly referred here.

Stigmacoccus, one in Brazil, one in India.

Ortheziola, 3. Two European; one in West Indies, but I suspect introduced.

Conchaspis, 3. Neotropical and Ceylon. No doubt spread by man.

Cerococcus, three North American, one in India.

Solenophora, 9. North and South America and New Zealand, in each case doubtless native.

Gossyparia, 5. Australia, New Zealand, Europe. Perhaps not all congeneric.

Erium, 7. Australia and America.

Rhizæcus, 4. Europe; one in West Indies, perhaps introduced.

Ripersiella, 4. Three in North America, one in New Zealand.

Takahashia, one in Mexico, one in Japan.

Protopulvinaria, one Neotropical, and Mr. Green has an undescribed one in Ceylon. I suspect that the Neotropical one was introduced from Asia.

Mallococcus, one in Brazil, one in China.

Ctenochiton, 15. New Zealand, Australia, and one in Mexico.

Cardiococcus, two in Australia, one in Mexico.

Inglisia, 8. New Zealand, Asia, Neotropical.

Ceroplastodes, 5. North America, Australia, Asia.

Akermes, 9. Neotropical and Australia. Some are probably not congeneric.

Paralecanium, 7. Australia, Asia, one in Brazil.

Diaspis, 30. America, and several Old World species which may not be strictly congeneric.

Poliaspis, 8. Australia, S. Africa, Japan.

Leucaspis, 8. Europe, Australia, Japan, Western America. The species are not all congeneric.

Cryptophyllaspis, 4. One in the United States, one in Ceylon, one in the Bismarck Archipelago, and one (accidentally omitted from the list) in Madeira. I think that these are probably not all really congeneric.

Odonaspis, 5. Tropical Asia; one in Brazil, surely introduced, I think.

Gymnaspis, 3. Asia, Australia and the Neotropical region; I believe introduced in the latter.

Some of the above cases should afford satisfaction to believers in

Antarctica. It is to be remarked, however, that some of them may appear in different light when we know more of the Coccidæ of tropical Asia. Nevertheless, it is hard not to think Ripersiella, Akermes, Ctenochiton etc. significant of some southern route.

(4.) Holarctic Genera.

I use the term Holarctic as a convenience, but do not mean thereby to abandon the Nearctic and Palæarctic as separate regions.

Xylococcus, 3.
Kermes, 28. On oaks. A species described from Australia can hardly be congeneric.
Trionymus, 2.
Antonina, 7 (also China).
Eulecanium, 71 (one in Brazil).
Lecanopsis, 3.
Exæretopus, 2.
Eriopeltis, 3.
Physokermes, 3.
Aclerda, 7 (and Natal, one species doubtfully congeneric).

(5.) Nearctic Genera.

Olliffiella, 1 (making a gall on oak).
Pseudophilippia, 1 (Florida).
Toumeyella, 6.
Pseudodiaspis, 2 (one in Mexico).
Gymnococcus, 3.
Philephedra, 1 (New Mexico).
Comstockiella, 1 (on palms).

These are all southern genera, from the very borders of the Neotropical, or evidently derived therefrom. There is no characteristic Nearctic genus, generally distributed throughout that region, and not found elsewhere.

(6.) Neotropical Genera.

Porococcus, 2 (Mexico).
Tectococcus, 1.
Apiococcus, 4.
Cryptokermes, 1.
Pulvinella, 1.
Alichtensia, 1.
Platinglisia, 1.
Pseudokermes, 2.
Stictolecanium, 1.
Mesolecanium, 12 (enters Sonoran).
Neolecanium, 12 (enters Nearctic).
Protodiaspis, 1.
Dactylopius, 3 (one entering Nearctic).
Carpochloroides, 1.
Capulinia, 3.
Termitococcus, 2.
Tectopulvinaria, 1.
Edwallia, 1.
Schizochlamidia, 1.
Eucalymnatus, 4 (one may be native in Asia).
Megasaissetia, 1.
Platysaissetia, 1.
Xanthophthalma, 1.

Pinnaspis, 2 (also Old World, whence probably introduced).
Pseudischnaspis, 3.
Diaspidistis, 1.
Morganella, 2 (widespread by human means).
Pseudoparlatoria, 4.

It will be noticed that many of these are monotypic; representing, no doubt, particular excessively differentiated types, not illustrative of any general tendency. Pinnaspis is so like the Old World Hemichionaspis that I feel nearly sure that it is introduced into America. One of its species is now widespread in both hemispheres.

(7.) New Zealand Genera.

Cœlostomidia, 5.
Eriochiton, 3 (one from India).
Phenacoleachia, 1.
Lecanochiton, 2.

Three of these appear to be genuinely isolated and very peculiar types.

(8.) Australian Genera.

Monophlebulus, 1.
Callipappus, 6.
Antecerococcus, 2.
Birchippia, 1.
Cylindrococcus, 4.
Sphærococcopsis, 1.
Epicoccus, 1.
Pseudoripersia, 1.
Myxolecanium 1 (New Guinea).
Alecanopsis, 1.
Frenchia, 2.
Apiomorpha, 34.
Opisthoscelis, 12.
Ascelis, 5.
Olliffia, 1.
Ourococcus, 3.
Lachnodius, 3.
Austrolichtensia, 1.
Cryptes, 1.
Maskellia, 1.

Here we have a genuinely peculiar fauna, the gall making genera being especially remarkable. Maskellia is the only Diaspine genus in the list, it will be noted, whereas the neotropical list includes seven genera of this group.

(9.) Genera of tropical Asia.

Monophlebus, 9 (three species, doubtfully congeneric, are African).
Drosicha, 6 (also Australasia).
Walkeriana, 7 (also African).
Kuwania, 2 (one in Japan).
Chætococcus, 1.
Ceronema, 3 (Australia to Japan).
Ericerus, 1.
Howardia, 1 (original locality uncertain).
Anomalococcus, 1.
Amorphococcus, 1.
Geococcus, 1.
Kermicus, 1.
Pseudopulvinaria, 1.
Vinsonia, 1.

Hemichionaspis, 10 (also Africa, etc).
Fiorinia, 25 (extended to Australia and New Zealand).
Pseudaonidia, 6 (also African).
Aonidia, 12 (one is Palæarctic).
Greeniella, 1.
Ischnaspis, 1 (origin uncertain).

It will be noticed that the faunæ of tropical Asia and Africa have elements in common, as might have been expected.

(10.) Genera of tropical Africa.

Lophococcus, 1.
Cissococcus, 1.
Halimococcus, 1 (also tropical Asia, undescribed species in Mr. Green's possession).
Tylococcus, 1 (Madagascar).
Lagosinia, 1.
Gascardia, 1 (Madagascar).
Cryptinglisia, 1.
Stictococcus, 1.
Selenaspidus, 1 (origin uncertain).

Some of these are very remarkable. The Coccid fauna of Africa is as yet very little known, and it doubtless contains many wonderful things.

(11.) Palæarctic genera.

Gueriniella, 1.
Pollinia, 2 (one is S. African.).
Newsteadia, 1.
Nidularia, 1.
Phœnicococcus, 1 (Algeria, an offshoot from the Ethiopian fauna).
Puto, 1.
Tetrura, 1.
Fonscolombia, 2.
Cryptococcus, 1.
Kuwanina, 1 (Japan).
Spermococcus, 1.
Luzulaspis, 1.
Filippia, 1.
Chelonicoccus, 1 (doubtful genus).
Parafairmairia, 1.
Aulacaspis, 6 (extends to tropical Asia, etc.).
Parlatoria, 17 (extends to tropical Asia, etc.).
Syngenaspis, 1.
Epidiaspis, 1.

It would seem that Europe has more peculiar types than North America.

T. D. A. COCKERELL.

Another Text-book of Entomology.[1]— "To induce the student to become acquainted, through personal observations in the field and laboratory, with some of the important biological problems as pre-

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[1] Hunter, S. J. *Elementary Studies in Insect Life.* Topeka, Kan. Crane and Co., 1903. 12mo, xviii + 344 pp., 234 figs.